Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte TERRY J. MAZANEC and THOMAS L. CABLE

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Appeal No. 1998-2345
Application 08/484,114

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ON BRIEF

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Before OWENS, DELMENDO and PAWLIKOWSKI, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the examiner's final rejection of claims 1-20. The rejections of claims 2, 4, 5 and 15-18 are withdrawn in the examiner's answer (page 2). Thus, the claims before us are claims 1, 3, 6-14, 19 and 20.

THE INVENTION

The appellants claim a process for separating oxygen from an oxygen containing fluid by use of a specified solid state membrane. Claim 1 is illustrative:

1. A process for the separation of oxygen from an oxygen containing fluid, comprising contacting said oxygen containing fluid with at least one solid state membrane, wherein said solid state membrane comprises

A) a structure selected from the group consisting of:

a) a fluid-impervious, electronically perovskitic material;

b) an intimate, gas-impervious, multi-phase mixture of an electronically-conductive phase and an oxygen ion conductive phase; and

c) combinations thereof;

and

B) a porous coating selected from the group consisting of metals, metal oxides and combinations thereof.

THE REFERENCES

Hazbun 4,791,079 Dec. 13, 1988

H. Iwahara et al. (Iwahara), "Mixed Conduction and Oxygen Permeation in Sintered Oxides of a System ZrO_2-Tb_4O_7", 24 *Adv. in Ceramics* 907-14 (1988).

THE REJECTIONS

The claims stand rejected as follows: claims 1, 3, 6-14 and 20 under 35 U.S.C. § 102(a) as being anticipated by Iwahara, and claims 1, 3, 6-14, 19 and 20 under 35 U.S.C. § 102(b) as being anticipated by Hazbun.

OPINION

We reverse the aforementioned rejections. We need to address only claim 1, which is the sole independent claim.

Rejection over Iwahara

Iwahara states that "[a] mixed conductor in which both oxide ions and electrons are mobile has a potential use for separating oxygen from air or other oxygen-containing gases, since oxygen only permeates electrochemically through such a material", and reports test results showing the mixed conduction and electrochemical oxygen permeability in sintered oxides of the ZrO_2-Tb_4O_7 system (page 907).

The appellants argue (brief, page 8) that Iwahara's disclosures that the sintered oxides "show patterns which correspond to a fluorite-type of face-centered cubic phase" (page 908), that "the lattice constants were measured"

(page 909), and that "the solid solution formation range of this fcc [face-centered cubic] phase was extended" (page 909), and also the disclosure of the x-ray diffraction pattern in Iwahara's figure 1 (page 909), are not indicative of any mixed-phase material. The examiner's response to the appellants' argument is that "the singular 'phase' set forth on page 908 of Iwahara may be a reference to one of the phases involved and is certainly not dispositive of the question whether the membrane is of multi or single phase" (answer, page 4).

The examiner's argument is that Iwahara's sintered oxide is formed by what is apparently a mechanical process since, in the examiner's view, there is no evidence of chemical reaction and, therefore, "[t]here is every reason to believe that each oxide would remain in a phase of its own" (answer, pages 4-5). Iwahara mixes fine powders of ZrO_2 and Tb_4O_7, fires the mixture at 1200°C in air for 10 hours, grinds the mixture and hydrostatically presses it into column-shaped or disk-shaped samples, and sinters the samples at 1500°C in air for 10 hours (pages 907-08). Although there is no mention of chemical reaction which would produce a single phase sintered oxide, the examiner has the

initial burden of providing evidence or technical reasoning which shows that the sintered oxide produced by Iwahara's process is a multi-phase mixture, and the examiner has not carried this burden. *See In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990); *In re King*, 801 F.2d 1324, 1327, 231 USPQ 136, 138-39 (Fed. Cir. 1986).

The examiner interprets the term "phase" broadly as encompassing any distinct and separate portion of a heterogeneous mixture, and argues that the appellants have the burden of demonstrating that Iwahara's membrane is not a multi-phase mixture (answer, page 5). The examiner, in effect, is arguing that Iwahara's sintered oxide inherently is a multi-phase mixture. When an examiner relies upon a theory of inherency, however, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances

is not sufficient." *Ex parte Skinner*, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986). The examiner has not provided the required evidence or technical reasoning, but, rather, has improperly relied upon the possibility that Iwahara's sintered oxide is a multi-phase mixture.

The examiner argues that Iwahara's platinum electrodes, which are formed by smearing platinum powder paste on both ends of the samples and then firing the samples, are porous because they allow oxygen to pass through, as evidenced by the title of the publication (answer, page 5). The title of the publication, however, pertains to oxygen permeation in ZrO_2-Tb_4O_7, not in platinum electrodes. Thus, the examiner's argument is not supported by the relied-upon evidence.

For the above reasons we conclude that the examiner has not carried the burden of establishing a *prima facie* case of anticipation of the claimed invention by Iwahara. Accordingly, we reverse the rejection over this reference.

Rejection over Hazbun

Hazbun discloses (col. 2, lines 57-65)

> a novel two-layer membrane in which one layer is an impervious mixed ion and electronic conducting ceramic such as yttria stabilized zirconis [sic] which is doped with sufficient CeO_2 or titanium dioxide to impart electron conducting characteristics to the ceramic. A

> second layer associated with the mixed conducting impervious ceramic is a porous ion conducting layer containing a selective hydrocarbon oxidation catalyst.

The first layer desirably has on its surface which contacts oxygen a thin layer of an oxide of lanthanum, chromium, tin or the like (col. 3, line 53 - col. 4, line 2).

The appellants argue that Hazbun discloses only the oxygen ion conducting portion of the appellants' multi-phase mixture (brief, page 10). The examiner argues that Hazbun clearly states that his membrane is both electronically conductive and ionically conductive, and that the appellants must "demonstrate by facts that the instant membrane in question is actually different from Hazbun as far as the character of the phase is concerned" (answer, page 6). The examiner has provided no evidence or technical reasoning which shows that Hazbun's membrane includes a multi-phase mixture of an electronically-conducting phase and an oxygen ion-conductive phase. The examiner, instead, puts the initial burden on the appellants, which is improper. *See Spada*, 911 F.2d at 708, 15 USPQ2d at 1657; *King*, 801 F.2d at 1327, 231 USPQ at 138-39. Because the examiner has not carried the initial burden of establishing a *prima facie* case of anticipation by Hazbun, we reverse the examiner's rejection over this reference.

DECISION

The rejections of claims 1, 3, 6-14 and 20 under 35 U.S.C. § 102(a) as being anticipated by Iwahara, and claims 1, 3, 6-14, 19 and 20 under 35 U.S.C. § 102(b) as being anticipated by Hazbun, are reversed.

REVERSED

TERRY J. OWENS Administrative Patent Judge	)	
ROMULO H. DELMENDO Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
BEVERLY A. PAWLIKOWSKI Administrative Patent Judge	)	

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